

## **Electrical - Upgrading the Main Electrical Panel**

The following 10 items pertain to upgrading the main electrical panel in a *single family dwelling* :

1. An **electrical permit is required** to upgrade the main panel.
2. The owner or a State-licensed contractor may obtain a permit.
3. Plans are not required.
4. Load calculations are generally not required for a service upgrade unless additional load is being added **and** the inspector determines that calculations are necessary.
5. **Undergrounding the main service entrance** is not required unless,
  - The existing service entrance is underground **or**
  - If required by either the Planning Department **or** PG&E.
6. The **height of the meter** must be between 48" to 66" above the ground.
7. The **clear working space** in front of a panel is 30" wide by 36" deep with a minimum headroom clearance of 6' 6".
8. **Circuit breakers** -
  - Circuit breakers must be **listed** and approved types for panels (The brand of breakers must be specifically approved for use within the panel as stated on the panel's label).
  - A multi-wire circuit (3-wire, 240 volt circuit) to a single duplex receptacle requires a **handle-tie** on the circuit breakers. This is commonly the case where a single duplex receptacle serves both the garbage disposal and the dishwasher.
9. **Grounding** shall be per the National Electric Code (NEC) - See Table 250-94 to size the grounding electrode conductor (GEC).
  - The *water piping* system is not allowed to be the **sole** grounding source.  
A supplemental electrode (usually a ground rod) must be installed **if** the water piping system is the **only** source of grounding.
  - A ground rod must be at least 8 feet buried in the ground. When made of iron or steel, the ground rod must be a minimum 5/8" diameter. Listed stainless steel or non-ferrous rods may be 1/2" in diameter. The ground rod should be located as close as practicable to the electric service.
10. **Bonding** shall be per the NEC - See Table 250-94 to size bonding conductors.  
**The water piping system must be bonded -**
  - If the main water service piping to the house is **metallic**, the bonding must occur within **five feet** of where the water service enters the house.
  - If the main water service piping is **non-metallic** (e.g. - PVC), the cold water piping system may be bonded at any accessible location.  
Note: Piping is commonly bonded at the water heater.
  - The hot and cold water piping systems are effectively bonded together via plumbing mixing valves at tubs and showers, etc. Therefore, the City of San Jose accepts a single bond to the cold water piping only.  
Note: An independent bonding jumper to the hot water piping is not required.**The gas piping system must be bonded -**
  - The gas piping is bonded via the grounding conductor in the branch circuit to the gas appliances (*if available*).
  - If the electrical system does not contain equipment grounds, then the gas piping system must be bonded externally with a bonding jumper (*same as water pipe*).
  - Gas bonding shall **only** be connected to the **house side** of the meter.  
For additional grounding and bonding requirements, refer to the NEC, Article 250.

Additional information can be obtained by visiting our website at [www.sanjoseca.gov/building/](http://www.sanjoseca.gov/building/) or by calling our Information Inspector's voice mail at (408) 535-3555 and leaving a detailed message. In addition you may visit the Building Division in City Hall at 200 East Santa Clara St. Our hours are 9:00 a.m. to 4:00 p.m. with limited service between 12:00 p.m. and 1:00 p.m.